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# Coated Cysteamine (PerC Cys)

Coated cysteamine (PerC Cys), produced by Hunan Perfly Biotech Co, Ltd., is a new type of coated cysteamine product. It uses the unique three-layer coating controlled-release technology to realize precise release in alimentary canal.

## Main Ingredients

Cysteamine Hydrochloride, silicon dioxide, starch and so on

## Action Mechanism

The growth of livestock is regulated by growth hormone (GH) secreted by pituitary. And the growth hormone (GH) secreted by pituitary is dually regulated by the growth hormone releasing hormone (GHRH) and somatostatin (SS) secreted by hypothalamus. The active sulfhydryl group of cysteamine (PerC Cys) can break the disulfide bond in the somatostatin (SS) molecule and destroy the molecular structure and biological activity of the somatostatin(SS), which effectively decreases the somatostatin (SS) levels and removes the inhibitory effect of somatostatin (SS) on anabolic and digestive functions, eventually promoting the secretion of endogenous growth hormone (GH) and various digestive enzymes, enhancing the body's anabolism to promote digestion and absorption of nutrients, and significantly promoting the rapid growth of animals, improving the lean percentage of carcass.

In addition, the active sulfhydryl group of cysteamine (PerC Cys) can convert cystine into cysteine, and then cysteine synthesizes with glutamate and glycine to form glutathione. Improvement on the concentration of glutathione, an important antioxidant in animals' body, can strengthen the ability of body's antioxidation and immunity, eventually improving meat quality, flesh color, strong water binding capacity (WBC), thereby, obtaining higher quality livestock products.

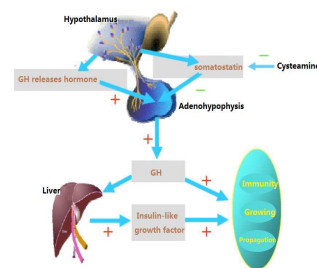


Figure 1. The Mechanism of Cysteamine Promoting Growth

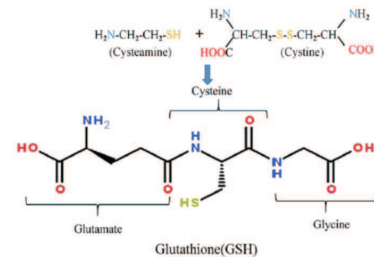


Figure 2. The Antioxidant Mechanism of Cysteamine

## Characteristics

1. Unique three-layer coating technology to realize the controlled-release in the whole alimentary canal.

Excessive and fast release of cysteamine can induce alimentary canal ulcer, but fixed-point slow release of small doses of cysteamine can promote digestion. So, the rate of coated cysteamine is very important. This product uses unique three-layer coated technology to realize the controlled-release according to the different requirements of different sites in alimentary canal, avoiding the irritation to gastric. The physiological homeostasis of animals is maintained while promoting growth.

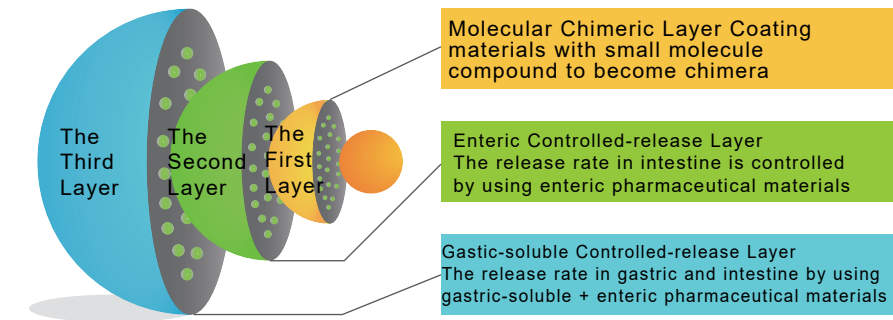


Figure3. Manufacturing Technique of PerC Cys

2. Good stability

The product is treated with the unique coatings, so it can be moisture-proof, anti-oxidation, high-temperature resistance, and it is particularly stable during feed processing and storage.

3. Good synergy

This product's unique excipients have a good synergy, which can help cysteamine remove the inhibitive effect of somatostatin (SS) on endocrine hormone to promote the synthesis and secretion of growth hormone and to accelerate the absorption of nutrients, metabolism, and protein synthesis.

4. Wide range of application

The use of product has no species differences, being suitable for all kinds of livestock, aquatic products, and ruminants.

## Efficacy

1. PerC Cys uses up somatostatin (SS) to promote the anabolic metabolism, significantly making the growth rate increase.
2. PerC Cys promote the digestion and absorption of nutrition to improve F/G.
3. PerC Cys can significantly improve lean percent and carcass quality, eventually causing ruddy flesh, strong water binding capacity (WBC), and less drip loss.
4. PerC Cys can improve lactation yield and milk quality of animals during lactation period.



## Compared Advantages

### 1. The Advantages of Water-proof and Antioxidation



Figure 4. The cooperating effects between different cysteamine and micro-elements

From the above picture, it is seen that PerC Cys cannot react with micro-elements to change color.

### 2. The Advantages of Insoluble in Gastric

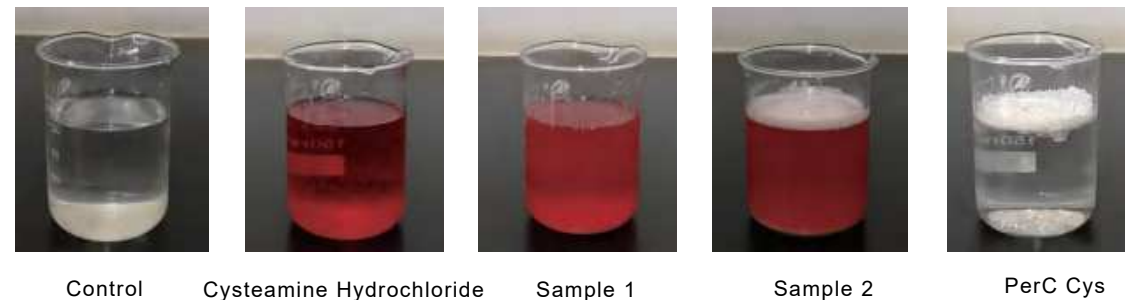


Figure 5. Dissolved effect of different cysteamine

From the above picture, it is seen that coated cysteamine (PerC Cys) can not cause redox indicator to color when a little redox indicator is added on the condition of simulating gastric acid, showing that it has a perfect coating effect.

### 3. The Advantages of Controlled-release in Alimentary Canal

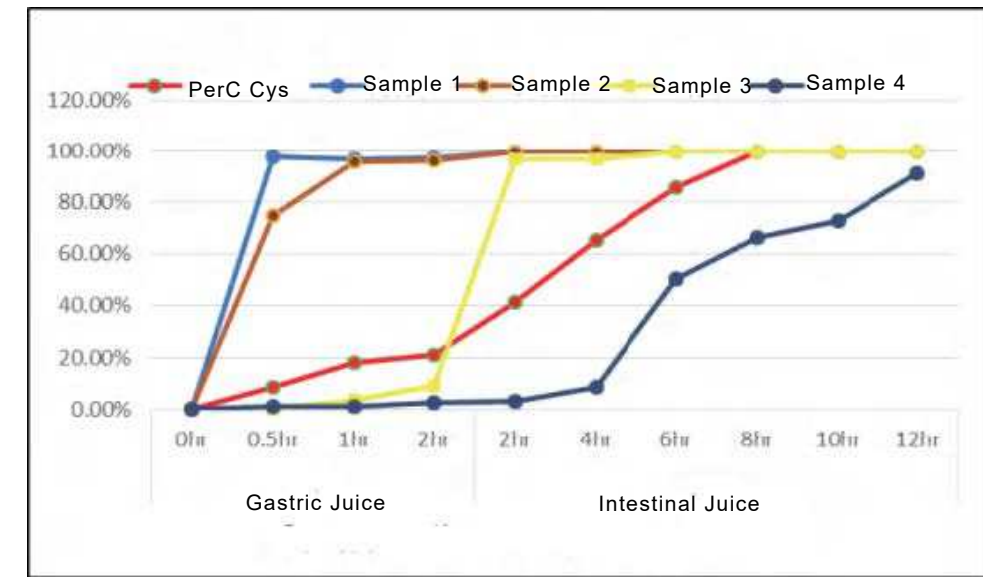


Figure 6. The controlled-release effect of different cysteamine in alimentary canal

From the above picture, the dissolution curves of cysteamine have three categories: firstly, they are a kind of soluble products with rapid release rate, they can be released completely within two hours in gastric juice or intestinal juice. So, they cannot be released slowly and can cause alimentary canal mucosa to damage. Secondly, they are a kind of insoluble products with slow release rate, they cannot be released in gastric juice but need to cost above 12 hours to release completely. Thirdly, they are controlled-release product, such as PerC Cys, 20% of cysteamine can be released in gastric, which takes effect as an endogenous acidifier, about 80% can be released in intestine slowly, which promotes growth.

## Application Effects

### 1. The Application in Pigs

106 growing pigs (DLY) were selected and their average weight was 62kg. Boars and sows were in half, they were randomly divided into two treatment groups; each group had six replicates; each replicate had 8-9 pigs. Control groups were fed with basic ration, trial groups were fed with 700g/t PerC Cys based on basic ration. Prestart period was 3 days, trial period was 74 days.

This trial results show that PerC Cys added in diets can improve ADG, yield of carcass, lean percentage, meat quality and FCR, and decrease F/G, fat percentage, backfat thickness.

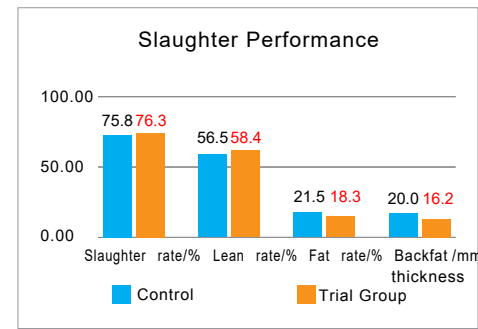
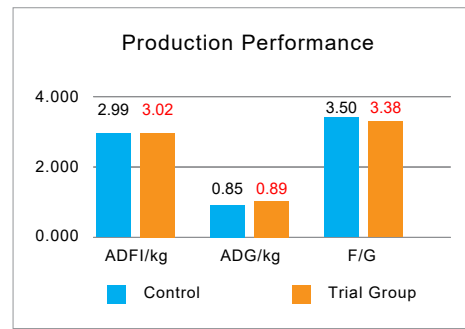


Figure 7. The effect of PerC Cys on growth performance Figure 8. The effect of PerC Cys on slaughter performance

| LSQ score and lean rate |           |               |                |                |             |                |
|-------------------------|-----------|---------------|----------------|----------------|-------------|----------------|
| Grouping                |           |               | Control Groups |                | Test Groups |                |
| Grade                   | LSQ       | Lean Rate (%) | No. of pigs    | Percentage (%) | No. of pigs | Percentage (%) |
| Excellent               | < 0.2     | 60.85         | 3              | 5.66           | 10          | 18.87          |
| Better                  | 0.21-0.26 | 58.75         | 12             | 22.64          | 10          | 18.87          |
| Good                    | 0.27-0.32 | 55.90         | 9              | 16.98          | 18          | 33.96          |
| Ordinary                | 0.33-0.38 | 53.54         | 17             | 32.08          | 10          | 18.87          |
| Low                     | 0.39-0.44 | 51.1          | 7              | 13.21          | 2           | 3.77           |
| Lower                   | > 0.45    | 48.42         | 5              | 9.43           | 3           | 5.66           |
| Total                   |           |               | 53             | 100.00         | 53          | 100.00         |
| Average LSQ             |           |               | 0.319          |                | 0.28        |                |
| Average Lean Rate %     |           |               | 54.23          |                | 56.32       |                |

Figure 9. The effect of PerC Cys on LSQ score

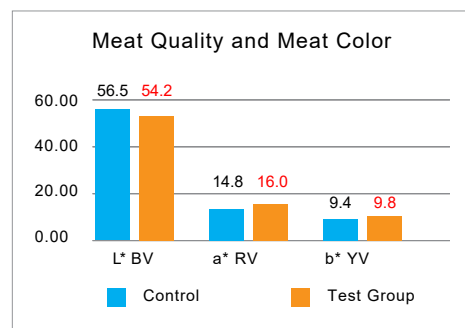


Figure 10. The effect of PerC Cys on meat color

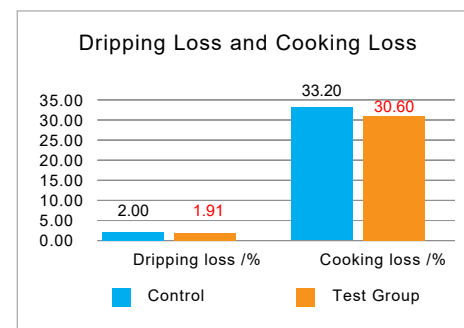


Figure 11. The effect of PerC Cys on meat quality

## 2. The Application in Poultry

1000 feather cherry valley ducks (1-day-old) were selected. They were randomly divided into two treatment groups. each treatment was five replicates, each replicate was 100 ducks. Control group was basic ration, 100mg/kg PerC Cys were added into trial groups based on basic ration. Trial period was 42 days, the production performance data were recorded on 14-day-old, 28-day-old, 42-day-old.

The trial results show that cysteamine added into Cherry Valley meat duck diets not only can promote the growth of meat ducks, slaughter weight and average daily gain at different growth stages, but also improve FCR, thereby cysteamine added in meat duck diets is useful.

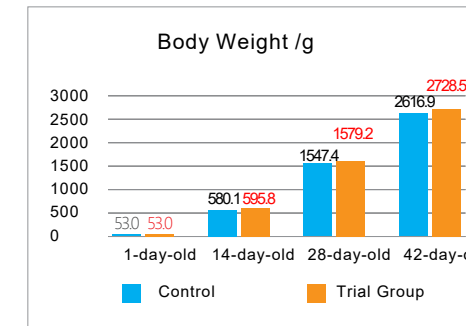


Figure 12. The effect of PerC Cys on body weight

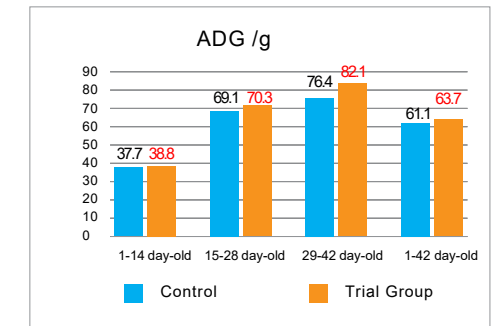


Figure 13. The effect of PerC Cys on ADG

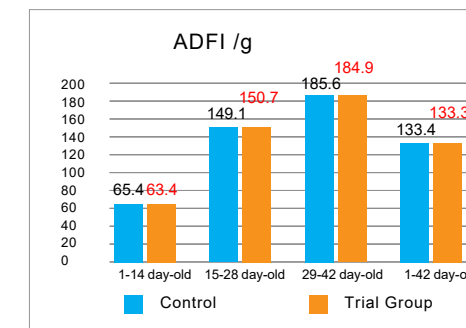


Figure 14. The effect of PerC Cys on average daily feed intake

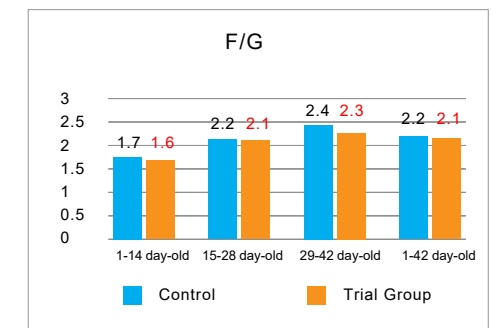


Figure 15. The effect of PerC Cys on F/G

### Note

Keep away from heat, moisture and direct sunlight, not with toxic and harmful substances mixed. This product is used as soon as possible after unpacking, the remaining parts need to tie up and keep in dark place

### Package

This product is packaged in a paper box, the net weight of product is 20kg, there are two bags in all, each is 10kg.

### Shelf-period

Under the condition of original package, the shelf life is 12 months.

### Usage & Dosage

Per T complete feed allowed to add this product:

| Species  | Dosage (g/T) |
|--|--------------|
| Piglets  | 150-200      |
| Fattening pigs                                   | 300-400      |
| Broilers and laying hens                         | 150-200      |
| Fish   | 200-300      |
| Calves/Lamb                                      | 600-1000     |
| Fattening beef cattle/<br>Fattening mutton sheep | 1000-2000    |
| Milk cow   | 2000         |

Note: for ruminants, if the daily feed intake of concentrated feed accounts for 1.5% of body weight, it is recommended that dosage could be added by lower limit; if the daily feed intake of concentrated feed accounts for 1% of body weight, it is recommended that dosage could be added by upper limit.